Immunotherapeutic approaches in prostate cancer: combinations and clinical integration.

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Abstract
Despite multiple immunologic approaches with peptide, protein, and DNA vaccines, no single therapy has induced complete remission or maintained durability of response in patients with castration-resistant prostate cancer (CRPC). Historically, immunotherapy has had limited effect on solid tumors with the exception of melanoma and renal cell carcinomas, which have been deemed as immunologic cancers given their potential for remissions either spontaneously or after removal of the primary lesion. There is considerable excitement about using an immunotherapy in combination with biologic agents such as checkpoint inhibitors, cytokines, other vaccines, or chemotherapy. Sipuleucel-T represents one of several novel immunologic therapeutic approaches to treat prostate cancer in addition to other solid tumors. It is the first in its class of autologous cellular therapies to demonstrate safety and an overall survival benefit in patients with asymptomatic or minimally symptomatic CRPC and represents a unique treatment method that may be further enhanced with other agents. Although sipuleucel-T can be used as a foundation on which to build and enhance future immunologic clinical trials, other exciting strategies are in development that may be easily integrated into the algorithm of current care.